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# Evidenced Based Asthma Education Intervention For Adults In A Primary Care Setting Using Self Management Guidlines

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EVIDENCE BASED ASTHMA EDUCATION INTERVENTION FOR ADULTS IN A  
PRIMARY CARE SETTING USING SELF MANAGEMENT GUIDELINES

By

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### Abstract

Using the standard of treatment for asthma developed by the expert panel reports from the National Heart, Lung, and Blood Institute allows a clear roadmap to patient centered control (National Heart Lung And Blood Institute, 2007). A focus on proper diagnosis and control of a patient's asthma, using self-management tools that will allow the patient to partner with their primary care provider is crucial to successful control of this disease (Safety Net Medical Home Initiative, 2010). In order to achieve this, educational interventions on control and reduction of exacerbations was taught in a primary care practice/medical home under the direction of a Doctorate of Nursing (DNP) candidate as a Certified Asthma Educator. This educational program with a focus on self-management techniques assessed the patient's correct use of medications, particularly of inhalers. These are documented in a planned asthma action plan that was created as a partnership with the primary provider and the patient. The pilot project was able to prove that evidence based asthma education intervention was effective to improve patient's asthma controls and encourage patients to be active participants. Patients are now specifically scheduled for asthma visits and education. The Asthma Control Test was a good measure for patients to identify their control. The primary care practice now uses every opportunity of encounter to address education.

Key words: asthma, adult, self-efficacy, self-management, quality of life, medical home

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### **Part 1 Problem Identification**

According to the Centers for Disease Control report of 2010, asthma is a public health problem with significant impact in the United States. It ranks among the country's most common chronic conditions. With the ongoing implementation of national and international guidelines, future costs for asthma will come from the treatment and management of the disease. There is no known cause or cure for this disease. Asthma is completely controllable, however, if we improve patient self-care behavior and capabilities (Chen, Sheu, Chang, Wang, & Huang, 2010).

The traditional model for patient education and care is contrasted with a patient centered model of education. In the patient centered model problems are identified by the patient, and education helps patients enhance their problem-solving skills. The goal in this model is self-management to increase patient self-efficacy. Patients are encouraged to solve their own problems with information, and not orders from their health care providers (Underwood, Revitt, Field, & Cowie, 1991).

Self-management was first identified by asthma education researcher Tom Creer in 1976 (Tousman, Zeitz, & Taylor, 2010), and it describes a person who is active in his or her own self-care. With self-management, the individual's ability to manage the symptoms, treatment, consequences (physical and psychosocial), and lifestyle changes is encouraged. In this type of learner-centered self-management, learners accept responsibility for managing their health and illness, and they are encouraged to make their own behavioral changes. Learners identify their own problems, and the teacher can facilitate problem solving and self-efficacy (Tousman, Zeitz, & Taylor, 2010). Patient teaching has historically been recognized as a nursing function, and a valuable aspect of health promotion in asthma (Underwood, Revitt, Field, & Cowie, 1991). Presently, more nurses are actively trained and involved in asthma education. Nurses who are

trained to conduct assessments, perform spirometry, provide education and instruct patients on self-management play an important role (Underwood, Revitt, Field, & Cowie, 1991).

Morbidity and death from asthma has increased dramatically over the last several years. Each year there are 2 million visits to emergency departments for patients with acute and chronic management of their symptoms of asthma (Schatz, Rachelsfsky, & Krishnan, 2009). Asthma is the sixth leading cause of hospital admissions (Miracia & Winston, 2001). Using the guidelines created by the National Asthma Education and Prevention Program (NAEPP) as a starting point we can individualize care that will result in the best outcome (Miracia & Winston, 2001). The National Health Lung and Blood Institute (NHLBI) asthma guidelines recommend that healthcare practitioners teach their patients to self-manage their disease. These guidelines can effectively lead to managed patient-driven asthma care that incorporates patients as active participants. These guidelines consist of and are organized recommendations for asthma care that contain four essential components for effective management. The key points stressed in the guidelines are as follows: (a) monitoring and assessing asthma severity, control, and response to treatment in conjunction with proper diagnosis; (b) asthma self-management education that is integrated into all aspects of asthma care; (c) the control of environmental factors and comorbid conditions; and (d) long-term management of asthma (National Heart Lung And Blood Institute, 2007).

This model is applicable in a medical home model that can effectively use the guidelines recommended by the National Heart, Lung and Blood Institute. A patient centered practice encourages patients to be involved in decisions about their care and the management of their health and illness. It uses proven communication strategies and decision aids to empower patients and enhance their decision-making and self-management (Safety Net Medical Home



Initiative, 2010). A patient-centered practice identifies patients, and recognizes that the patient is the expert on his or her own life. The patient and their family drive their care, and need to be more involved in decisions about their care, and in the management of their health. The patient and their family play a central role in planning their health and wellness, as they actively engage in their healthcare (Safety Net Medical Home Initiative, 2010).

### **Statement of the Problem**

Asthma is defined as a chronic condition characterized by airflow obstruction and chronic inflammation. The major problem with management of asthma today is not lack of effective and safe medication. Despite effective medication, many asthmatics are under treated for a number of reasons, with a negative impact on their quality of life (Baptist, Deol, Reddy, Nelson, & Clark, 2012). Poor compliance to prescribed medication, poor perception of symptoms and lack of knowledge or instruction of how to act in case of asthma deterioration are probably the most important factors behind the high asthma morbidity (Lindberg, Ahlner, Moller, & Ekstrom, 1999). Evidence based asthma practice in primary health care, that incorporates the international consensus document on asthma management has a positive effect on asthma morbidity and disease control (Lindberg, Ahlner, Moller, & Ekstrom, 1999).

A report prepared by the Agency for Health Care Research and Quality (AHRQ) titled: *“Engaging Patients and Families in the Medical Home”*, which has its research based on the Institute of Medicine’s report, *“Crossing the Quality Chasm”* identified that supporting patients in improving their health is a key expectation for the medical home (Scholle, Torda, Peikes, Han, & Genevro, 2010). Patients are helped to manage chronic diseases, like asthma by following self-care guidelines about diet, exercise, medication adherence, and symptom recognition. A recent review showed that a variety of efforts to support patient self-management have

demonstrated positive effects on patient outcomes, knowledge, and self-efficacy. There is evidence that there needs to be adaptation to self-care support to patient's self-efficacy (Scholle, Torda, Peikes, Han, & Genevro, 2010).

Patients can no longer just rely on their provider to instruct them on how and when medications are used. If patients wait until they are instructed to take a particular medication or perform a particular action, the result will be an acute episode (Williams, Schmidt, Redd, & Storms, 2003).

Asthma is characterized by varying signs and symptoms. In order for appropriate treatment to occur, patients must monitor symptoms. This monitoring of symptoms must be an active role the patient takes that has been guided by patient education. Therefore, at each visit, the provider should assess the patient's self-management skills, including monitoring of their symptoms, correct technique for use of inhalers, spacers, and peak flow meters. All patients should have access to, and be instructed in the use of devices needed to administer medication or monitor their asthma (e.g., inhalers, spacers, nebulizers, and peak flow meters (PFM)). The plan is instructional, a carefully written plan that is developed by the patient and provider. Writing the management plan helps clarify expectations for treatment. It also provides patients with an easy reference for remembering how to manage their asthma. A patient's ability to take asthma medications is a necessary skill of self-management (Williams, Schmidt, Redd, & Storms, 2003).

The goals of asthma treatment are to prevent chronic troublesome symptoms, maintain optimal lung function, maintain normal activity, prevent recurrent exacerbations of asthma, minimize the need for emergency care, provide optimal pharmacotherapy with minimal or no adverse effects, and satisfy expectations of asthma care (Jansen, McGrath, Covington, Cheng, & Boushey, 2009). "The ultimate goal of both expert care and patient self-management is

to reduce the impact of asthma on related morbidity, functional ability and quality of life” (Jones.2008 p.778).

### **Evidence of the Problem**

Asthma is a common chronic disease responsible for substantial health care costs, including emergency department visits and hospital admissions. These costs are potentially preventable with better ongoing disease control (Raju, Soni, Aziz, Tiemstra, & Hasnain, 2012). Lack of access to asthma care, education, and medications are an important issue in the United States. Medications and health care visits are expensive. In teaching patients how to better manage their medications by using them correctly, patients will use less medication and their costs will decrease. Patient’s fears and misconceptions about medications need to be addressed in order for them to adhere to the medical regimen. This will have an effect on frequency of visits as patients will be better managed (Partridge, 2004).

One aspect of the complexity of asthma, was revealed by data compiled from the Patient Asthma Insights and Reality survey, which was administered in 1998 to assess patient’s symptom severity and control. This was administered in 29 countries in North America, Asia and Europe (7786 adults and 3153 children (by proxy). Objective and subjective patient perception of asthma control and severity were assessed, including access to medical care, health care use, missed work-school, and medication use (Rabe et al., 2004). The survey found that many patients overestimate their level of disease control, often tolerating substantial asthma symptoms and having low expectations about the degree of control that is possible. Many patients may assume that a certain level of symptoms or some limitation of activity is an inevitable consequence of having asthma. In fact, 39% to 70% of respondents to the Asthma Insights and

Reality (AIR) surveys reported that their asthma was well controlled or completely controlled even though they were experiencing moderate symptoms.

Another aspect of the problem is that many health care providers underestimate the severity of asthma symptoms and underutilize written action plans, despite the evidence. The written action plan can help the physician assess if the patient is achieving control of their disease (Wechsler, 2009). As the focus of asthma management is now looking to shift from managing acute attacks to achieving asthma control, the need for a supplemental measure that can reliably identify patients whose asthma is not in control has become apparent. The Asthma Control Test (ACT) is a brief patient- based assessment tool to assess asthma control. Asthma treatment guidelines alone are not enough to ensure the proper assessment of asthma control. The deficiency in the assessment of asthma control points to the need for a simple method for quantifying asthma control by both patients and physicians. The five questions in the ACT questionnaire identify “the dimensions of asthma control that underlie current asthma management guidelines, asthma symptoms, use of rescue medications, and the impact of asthma on everyday functioning, and support the premise that asthma control is a multidimensional construct”(Nathan et al., 2004 p.63). The questionnaire consists of five questions to assess asthma control in the previous four weeks. The sum of the scores of the five questions give the total ACT scores (range 5–25). The higher the score, the better the asthma control (Ko et al., 2012).

The evidence is persuasive that the most important components of asthma education are (1) partnership between the patient and provider and (2) a written action plan that gives the patient some latitude in determining changes to the medication regimen, based on symptoms or peak flow measurements (Jones, 2008). Of extreme importance are patient-important outcomes

such as good symptom control, fewer missed work days, fewer exacerbations, lower costs, and better patient confidence that symptoms are controllable and not constrain normal activities (Jones, 2008).

Maridee Jones stated in her research on asthma self-management that in most institutions there is inadequate incentive for physicians to make the time to develop collaborative partnerships with patients and to provide high-quality asthma-self-management education, and there is considerable financial pressure (Jones 2008). What needs to be demonstrated to providers is that self-management education can decrease the cost of care in high-risk patients and alleviate the pressure to see as many patients as possible during a clinic day (Jones, 2008). Evidence supporting the self-management approach was seen in a Cochrane review of 36 trials that compared usual care to self-management plus regular review and an action plan found:(1) more regular physician visits, (2) fewer emergency department visits and hospital admissions, (3) slightly better lung function and peak flow measurements, (4) fewer medications overall, and (5) less use of rescue medication (Jones, 2008).

### **Review of Literature**

The results of the literature review show that: A written asthma action plan is essential and should be developed in partnership with the patient (Pruitt, 2011). Interventions that can affect positive outcomes will have as their components the actual mechanisms of how to induce behavioral change for improved disease management. Corbridge and Corbridge (2010) found that the best way to treat asthma is to give patients the tools to participate in their own care. This plan has been developed in collaboration and has been shown to enhance patient-provider communication and improve outcomes.

Patients' needs are addressed when they are offered self-management education that focuses on their individual needs. This is reinforced through a written action plan. The use of the written action plan improves the patient's participation in his or her own care (Pinnock et al., 2003). Participation in goal setting of treatment is essential and should include the basics on diagnosis and individualized treatment (Musto, 2003). For example, patients can look at the self-management tools they developed with their provider and identify and problem-solve a solution. This solution incorporates patient involvement in their care. Patients look at the problem they are experiencing as within their control. This plan is formally written into an Asthma Action Plan. In order for it to be effective the Asthma Action Plan or guided self-management plan will be reviewed and refined at every healthcare visit (Musto, 2003). Fishwick, D'Souza and Beasley (1997) found in their study that individual asthmatic patients make changes to their treatment in response to the recognition of changes in the severity of their asthma in accordance with predetermined guidelines. Al-Sheyab, Gallagher, Crisp, and Shah (2011) did a cluster-randomized controlled trial using the Asthma Action Plan. This plan reinforced the guidelines related to self-management by the patient and incorporated active participation. In their study, using educational programs that incorporated the national guidelines with the self-efficacy concept, individuals showed an improvement in their asthma-related quality of life. Olajos-Clow et al. (2005) did a prospective observational design that demonstrated self-management skills that promoted behavior change with the use of asthma education, improved a patient's quality of life.

In 2007, the NAEPP guidelines were updated; a significant change in this version was the focus on asthma care and education being an ongoing assessment of disease control and on improving the management of asthma. The new guidelines specifically address the use of a

template to assess the difference in asthma severity. With this assessment, evaluation of the patient level of control with current treatment of their asthma is evaluated (Wechsler, 2009). Patients are helped to understand control and what to do when exacerbations occur. The steps that the patient should take are clearly planned with the patient by the provider in order to decrease the severity or reduce the frequency of exacerbations. The template encourages the provider to focus on asthma education through patient and provider interaction (Centers for Disease Control and Prevention, 2010). The template becomes the tool the patient and provider use to assess the response to care. The more the patient can be a part of this interactive process, the more beneficial the outcome will be and the more successful the disease control.

Another template of self-management support is evident in the chronic care model. The chronic care model was developed by Ed Wagner at the MacColl Institute for Healthcare Innovation, and is used by the medical home model. This model identifies that patient self-management, delivery system design and community resources are all critical components (Featherston, 2012). Change in practice delivery of asthma care is important. One of the key elements of the “chronic care model” for the treatment of chronic disease is the addition of an asthma nurse educator who encourages self-management. The chronic care model was developed by Wagner to offer a collaborative approach to chronic conditions, patients are encouraged to collaborate fully in the management of their care (The Improving Chronic Illness Care Program, 2012).

It is important to remember that for people with asthma, “self-management” refers to self-monitoring changes in disease severity, appropriate knowledge about asthma and its provoking factors, knowledge of medications, adherence to inhaled medications, recognition of symptoms, and self-adjustment of medical therapy. This form of self-management is called

guided self-care, the patient takes an active role in their care and managing their symptoms (Huang, Li, & Wang, 2008). The tracking of important measures of disease activity (e.g., symptoms, the use of rescue medications, missed days of school or work) is a tool that is part of the recommended guidelines for assessing asthma control and the risk of exacerbations.(Huang, Li, & Wang, 2008).

Tracking in asthma is important because of the variability of treatment effectiveness (James & Fine, 2008). Without tracking, asthma can remain uncontrolled. Positive health outcomes have been associated with provider-patient interactions that are participatory, interactive, and allow patients to effectively communicate (Butz et al., 2007). A structured follow-up program and patient education are necessary in order for successful outcome of self-managed care in asthma. Treatment must be tailored to each patient's need (Linderberg, Ahlner, Moller, & Ekstrom, 1999).

The cornerstones of the guidelines for the management of asthma are control of symptoms and prevention of adverse outcomes. Still today these components of the Healthy People Initiative 2020 have not been completely incorporated in patient care, resulting in incomplete disease control (Akinbami et al., 2011). The Healthy People Initiative is overseen by the Department of Health and Human Services to set goals and programs that provide a science-based approach for identifying and measuring our public health priorities (Healthy People Initiative, 2011). Nurses have seen for a long time how their role has been to allow patients to feel there is collaboration in the learning process. As documented in "Nurses: Partners in Asthma Care," "nurses have played a vital role in how patients can learn to take specific actions that are needed to control their asthma" (NHLBI, 1995, p. 12). Using learner-centered self-management programs, providers of care collaborate to improve outcomes, such as effective asthma control,



increased self-efficacy, increased asthma knowledge, decreased depression, and improved quality of life (Tousman et al., 2010). The key principle here is the collaboration between patient and provider that is facilitated through the use of these tools. This gives the patient the feeling of control.

### **Part 2 -Theoretical Conceptual Framework**

Self-management is the patient working in partnership with others. Self-management is often misunderstood by patients and providers. The terms “self” and ‘manage’ suggests that the patient has ownership of the condition, and will be responsible for managing their condition in isolation or without assistance. This partnership is to promote their health, manage their signs and symptoms, monitor behaviors and manage the impact of their condition (Featherston, 2012).

In asthma management, self-efficacy is accomplished through patients’ self-confidence in the ability to control their asthma, which improves along with the ability to learn the skills that will control it (O’Laughlen, Hollen, & Ting, 2009). This self–confidence in being able to perform a specific behavior in a specific situation is termed self-efficacy (Martin et al., 2009). Perceived self-efficacy creates a positive relationship between knowledge and action, it is the person’s belief that he or she can execute the behavior, facilitate change, and attain mastery (O’Laughlen et al., 2009). The use of self-management was used in the program at the medical practice as the theoretical model incorporating the self-efficacy model within the medical home. It is important in teaching patients to self-manage that we are aware of all of the factors that influence whether they will be successful.

According to psychologist Albert Bandura (1977), social cognitive theory and self-efficacy theory are related to empowerment. Self-efficacy inspires people to carry out behaviors required to achieve a desired goal (Chen et al., 2010). Bandura looked at how a person’s beliefs

could help make changes in behavior successful. He stated that a person's belief about his or her own efficacy could be developed through four main sources of influence: (a) performance accomplishments, (b) vicarious experiences, (c) verbal persuasion, and (d) self-appraisal. According to Bandura, these factors increase self-efficacy individually or collectively (O'Laughlen, Hollen, & Ting, 2009). If an individual learns to monitor his/her behavior then behavioral change can occur. Individuals learn to set short range, attainable sub goals to motivate and direct the change efforts with social supports to sustain the effort needed to succeed. If they have high self-efficacy, they will persevere and ultimately succeed, even if they initially fail.

Through asthma education, the individual is encouraged to achieve increasing behavioral changes that are asthma specific. This achievement leads to an increase in self-efficacy expectations of successful behavior (Klein et al., 2001).

### **Bringing the Theoretical Framework to the Practice Setting**

Based on this review of evidence, guidelines, and informed by Bandura's (1977) theory of self-efficacy, improving the current views on how asthma education will be provided is achieved by using self-efficacy strategies. These enable individuals with asthma to feel they are active participants in successful outcomes. Guided self-management is a principle of Bandura's theory of self-efficacy and will be used in the educational program. This self-management is the key for success in a good educational program as it allows the patient to be an active participant. Patients will be given the tools to be in control of their lives and their disease process. The relationship between provider and patient was encouraged as a partnership.

### **Part 3 - Project Description, Implementation, and Monitoring**

#### **Aims of the Project**

The aim of the project was to have patients improve their asthma specific behaviors based on the National Institute of Heart, Lung and Blood Institute asthma guidelines.

A key role for the DNP candidate was to have providers and staff able to have patients understand their medications, and increase their ability to identify the difference between long-term controller medications and quick relief inhalers. Patients, through return demonstrations, would demonstrate correct medication techniques (ex: inhaler techniques). The aim was to create a change in the clinical environment and develop clear protocols on asthma management. To improve the practice management of asthma the DNP candidate identified the learning needs of staff and patients. A program was developed to decrease asthma signs and symptoms experienced by patients as part of the practice improvement. The creation of this improvement plan resulted in an asthma management guideline for all patients.

The project used the medical home model and the key messages recommended by the National Institutes of Heart, Blood and Lung Institute to provide evidence based care. The project was initiated in a primary care practice that is a level three medical home. The project was a quality improvement project within this medical home. The medical home addressed the patient needs from the moment of contact. Using template (A) in appendix we can see the workflow that occurred in the practice. All staff demonstrated understanding of the guidelines through the pre and post survey after instruction on the guidelines and explanation of the key components of the project. “Organizations need to have a system where education is integrated into everything that goes on in the clinical setting. The minute a patient walks into the clinic the education must start and the message must continue to be reinforced through the treatment”

(Utah Department Of Health, 2009 p. 1). This model of care practiced in Vermont is the “Vermont Blueprint for Health”, which has set a clear vision for a statewide system of care that improves the lives of those with chronic conditions. This model of care that is the basis of the medical home model will create the partnership for the system change in the practice (Department Of Vermont Health Access, 2012). To achieve this in the practice setting, the nurse and patient set realistic step-by-step goals to better manage their asthma. Each patient is coached by a nurse, or other medical staff who monitor disease control, and work with the patient’s primary care provider to make changes in medications and lifestyle in order to reach treatment goals (Safety Net Medical Home Initiative, 2010).

In empowering patients and supporting them in understanding and implementing their care plan, they identify self-management goals, and develop real plans to achieve these goals (Safety Net Medical Home Initiative, 2010). The first steps in a “patient centered” approach involves determining the patients understanding of the disease, and the impact of asthma on their daily activities (Underwood, Revitt, Field, & Cowie, 1991). Enabling patients to make good choices and sustain healthy behaviors requires a collaborative relationship: a new health partnership between health care providers and teams, and patients and their families. This partnership supports patients in building the skills and confidence they need to lead active and fulfilling lives (Improving Chronic Illness Care, 2012).

## **Methods**

### **Study Design, Target Population, and Sample**

The quality improvement project used a pre-post-test study design within a designated medical home practice. The target population were patients registered with the Deerfield Valley Practice who are aged 18 or over with asthma seen within the last two years. The sample was

identified by a computerized search from the electronic system available at the medical practice, for relevant codes for the condition, their management and medication treatment. There was 720 patients identified with asthma. These patients were evaluated on criteria specified. For this project at least 25 patients were asked to participate in asthma education with DNP candidate. Asthma specific assessments were done by trained staff or providers during asthma scheduled visits. Pulmonary function tests were administered by DNP candidate, or staff when DNP candidate was unavailable. Asthma care plans were completed with patient input by the asthma educator (DNP candidate) or provider, and controller and rescue medications were clearly written in plan.

The validated, five question Asthma Control Test (ACT) identified asthma control for the last 4 weeks. This was given at initial visit and subsequent visits and recorded into patient electronic medical record. The ACT questionnaire records daily activity level, nighttime symptoms, rescue bronchodilator use, shortness of breath and, a global assessment of control. Scores below 19 indicated that asthma was well controlled (Nathan et al). The International Guidelines for asthma care were used to include documentation of severity score, and control score on all patients with asthma (Department Of Vermont Health Access, 2012).

Medication refills were monitored by all staff in contact with patient. In order to have patients understand peak flow, instruction and return demonstration were encouraged. If patient has peak flow measures as part of their Asthma Action Plan they brought peak flow measures to all visits.

As part of the quality improvement project, communication between the Case Manager and DNP candidate occurred to review patients that were in the program. This

communication included any emergency room visits, hospitalizations, or urgent care days. This information was transmitted to staff, case manager and providers.

### **Eligibility Criteria**

All patients that receive their primary care through the medical home in Wilmington, Vermont and are patients of Southwestern Vermont Health Care-Deerfield Valley Campus (SVMC/DVHC) were eligible. They listed their primary provider as an SVHC/DVHC provider. Institutional support is documented in Appendix E. They were seen in the last 2 years and have a diagnosis of asthma. Exclusion criteria consisted of patients identified with a known cognitive impairment or psychiatric disorder that made them ineligible for complete participation. Patients that spoke or understood Spanish were included. If needed those that spoke other languages were included if interpreter services were available from the hospital. Other comorbid conditions were not excluded unless they prevented the patient from participating fully in the plan.

### **Sample Size and Participation**

The goal was to identify at least 50% of the active patients to participate that were eligible due to passing exclusion and inclusion criteria. The expected number from this criteria was a minimum of 25 patients. Of those patients identified as eligible an attempt was made for a minimum of 25% to receive a planned asthma visit (see Appendix D). Patients were identified and reviewed for their eligibility with the primary care provider and the medical home case manager. The DNP candidate project/leader explained the project to each participant during the pre-visit and then set up an appointment to meet with the patient at a scheduled asthma visit. Some visits were in conjunction with a scheduled visit. This was discouraged by the DNP candidate project leader as much as possible.

**Data Collection and Methods (Procedures for Implementation)**

Patients received a consent for care form from the practice at each visit. In addition, patients were informed of the project and the information that was collected and asked for consent to further education. If in agreement, the patient signed the consent form (see Appendix B). This form was reviewed and if necessary read to the patient. Questions were allowed before the patient signed it. In addition the DNP candidate has a CORI clearance and has complete HIPPA/confidentiality signed releases with the hospital which the practice is affiliated with. Data collected from participants was confidential. Confidentiality was assured by identifying patients by identification numbers. A master key to these numbers was maintained in a separate and secure location in the PI's office. All electronic files (e.g. database, spreadsheet, etc.) containing identifiable information was password protected. All computers in the practice are password protected. Only the PI has access to the password of files. All data was kept in a locked secure office, or in password protected files on the PI's computer.

Patients were called pre-visit to identify needs for the planned visit. An important part of the medical home concept is visit preparation (Safety Net Medical Home Initiative, 2010). Planning of the asthma visit followed flowchart (see appendix A).

They were then monitored on asthma control at the planned visit and at additional visits based on current asthma control. With the NHBLI guidelines being used as a template, the visits were scheduled at 2 to 6 week intervals for patients starting therapy or requiring a change in medications to achieve or regain asthma control. For those patients with a diagnosis of asthma that was current, a planned visit was implemented. The interval depended on factors like the duration of asthma control or the level of treatment required.

Education was provided on self-monitoring, including assessment of level of asthma control and, how to monitor symptoms. If prescribed, peak flow measures were written into an Asthma Action Plan. In addition patients were instructed on how to recognize early signs and symptoms of worsening asthma, and how using a written asthma action plan would assist in this recognition. The plan was an instruction template for patients explaining how to take daily actions to control asthma and adjust medication in response to signs of worsening asthma (see Appendix D).

Education for staff based on asthma guidelines was given by DNP candidate/Asthma Educator to improve the care of patients. The medical team received in-services on asthma education and guided self-management by the asthma educator (DNP candidate). They were also instructed on how to reinforce the education and give additional education as needed (Underwood, Revitt, Field, & Cowie, 1991).

An asthma project registry was implemented that identified all patients with asthma (diagnosis code of 493.xx) that required visits (see Appendix J). Follow-up progress was supervised by DNP candidate. The registry was a chart audit identifying patients with diagnosis of asthma. Patients were called and encouraged to come in for asthma specific visit (pre-visit call). Visits began with the Asthma Educator (DNP candidate). These visits were at least 30-60 minutes. This visit involved guided self-management lessons for patients (including symptom monitoring), medication training as needed, peak flow training, and spirometry administration. These visits allowed for feedback and reinforcement of skills. Self-management goals were set by the patient and documented in the chart.

All consenting participants were evaluated pre and post with collected data obtained from asthma registry. Only identifying numbers from the registry were used for study.



The design was a pre and post comparison of outcome measures. These measures included: a decrease in acute episodes of participants by 50%, an increase in patient perceived self-efficacy as demonstrated by an increase in demonstrated knowledge of control by 50%. Decrease of 80% of patient incorrect use of rescue inhalers.

Pre and post testing met the criteria that is evidenced based and recommended by the National Heart, Lung, and Blood Institute (NHLBI). The registry data served as a comparison of the intervention pre and post. The comparison spanned from the initial pre-visit set up appointment to final follow up visit.

To facilitate the patient's participation the first visit was divided into two separate visits. If assessed and needed, the visit was increased in length of time. If the patients felt there was more time needed, then a decision was made to increase the maximum amount of time for the appointments. All patients were informed they may discontinue their participation in the project at any time. Participants were also informed that there would be no repercussions or change in their practice benefits if they chose not to participate. All data was entered in an excel spread and graphed to identify meaningful information.

Information from initial and subsequent visits was shared with the primary physician, and the medical home team. All information disclosed was approved as evidenced by the signed release of the patient. The primary care physician reviewed the report and made recommendations as needed. All changes in plan of care were documented by the provider and reviewed with the patient for accuracy and understanding.

A final visit collected post test data and addressed changes that had been made. It included all items listed in the asthma registry created. This included patient's asthma care plan,

the patient's understanding of asthma, medications, and symptom control. Assessment of all interventions including education was done at final visit.

The intervention required the entire practice to understand self-management and how this can improve self-efficacy and patient's quality of life. As stated previously, the medical home model of care with the chronic care template was used to address changes in care delivery for patients with asthma. The DNP candidate guided, intervened and educated staff and patients on the commitment to these models of care. The student provided the training for providers, patients and staff in order for this to be accomplished. DNP candidate acted as facilitator to make sure all the steps in the process were accomplished as well as at times leading by example.

Patients received complete education on what asthma is, causes, triggers, action plan, medication administration (inhaler use), importance of yearly spirometry, peak flow meters if needed, immunizations as recommended (yearly flu shots, pneumonia vaccine if age appropriate). This education was given by DNP candidate or facilitated by student with trained staff to all patients in participation group that had consented for complete intervention. The intervention required a complete participation of the patient, providers and staff to learn and be educated on self-management care. Each patient has a useful care plan that either identifies symptom management or peak flow management and how to respond to their disease. To measure an improvement in self-efficacy, factors that reflect improvement were identified. These include: demonstration of performance accomplishment as identified by a patient's ability to demonstrate correct medication technique, patients independent self-appraisal of improvement of control. The patient also demonstrated self-management goals that were attained or are in the process of attainment. Provider partnership allowed input of the patient for medication management.

### **Plan for Action and Implementation**

This project hoped to identify ongoing asthma education needs of patients that are actively seeking care in the Deerfield Valley Health Center medical home. The project identified assessment needs of staff of correct asthma severity scales, and management based on those scales. The plan promoted an organizational change within the practice as a planned asthma care visit. The project outcome was to seek change from what is currently a reactive health care system into one that keeps its patients as healthy as possible through pro-active planning, proven strategies and management. In order to be a non-acute care reactive environment the plan changed the current asthma patient visit from one that is acute exacerbation driven to one that is preventative. The plan goals created a pre-visit protocol that involved a phone call to the patient, a pre-visit plan for the asthma patient that involved determining if all of the checklist items (from registry) were in the patients' medical record. The planned asthma visit included: an asthma action plan, spirometry (yearly), 6 month follow up visit, proper immunizations documented or note of refusal, proper documentation of asthma severity and control(Appendix A). The additional goal was to maintain follow up care that is based on the NAECCPP guidelines. The goal of the project was to increase the use of evidence based practice guidelines. Outline for the goals are in appendix D with the planned timeline in appendix F.

Through the use of the medical home model of care and evidence collected through this project, a system developed that can easily sustain itself through the practice was implemented. The evidence of self-management that is patient centered becomes a practice cornerstone. This information was shared with the Blueprint for Health Committee, which is part of the medical home. The information was also shared with the Asthma Collaborative (part of the blueprint project).

The program began in the early spring of 2013 and ended with the final submission summary in April 2013. The key intervention phase began in February 2013. Implementation was dependent on patients, primary care provider, and staff of the medical home.

The majority of costs were part of the educational process of the facility with the assistance of the Blue Print (See appendix G). The budget for the program was volunteer based or facilitated by the Blueprint or hospital and be a donation toward improved care. Any additional costs will be funded by the Blueprint of Vermont. Resources for space, office equipment, and telephone and access to database and resources were provided by Southern Vermont Health Care Deerfield Valley campus.

### **Data Analysis and Project Evaluation Plan**

Demographic data was analyzed using descriptive statistics (mean, SD, frequencies and percent). Secondary data was measured as continuous data (ACT score), using a paired t-test. Categorical data was analyzed using nonparametric techniques to describe the population based on diagnoses, severity of asthma, control of asthma, action plans, acute exacerbations, asthma education. The first level of evaluation was the analyses of the asthma registry database. The final analysis was a comparison of the pre and post test data obtained using a paired –t-test using Minitab statistical software.

Review of the data and interpretation was done by the DNP candidate. It was given to all parties: the Doctoral advising committee, Southwestern Vermont Health Center leadership, and interested staff.

The expectation of the program was that a structured follow-up program and patient education is fundamental for the successful outcome of self-managed care in asthma. Treatment of asthma must be tailored to each patient's needs. It is important to stress proper use of

medications, how to address symptoms and how to identify exacerbations in condition. Patients will take responsibility for their disease by education. The use of the medical home model of care assists the primary provider in an improved level of care (Lindberg, Ahlner, Moller, & Ekstrom, 1999).

### **Specific Characteristics of Project**

The quality improvement project was begun at a primary practice. The practice chosen was a division of Southwestern Vermont Medical Center, the facility site is called Deerfield Valley Campus. A report was run from all charts through the electronic medical record for patients having the diagnosis code of 493 in their problem list (this refers to asthma diagnosis of any classification). This diagnosis code was for asthma Non- specific and specific. It involved a broad range of diagnosis classification. This report resulted in a list of 356 patients in the practice that fit this criteria. After visually checking each chart for proper diagnosis, the number increased to 648. These charts were looked at to eliminate those patients who had not been seen in the last three years. This brought the number to 469 patients for the three providers currently practicing in the practice.

Prior to the quality improvement project, no patients received an ACT, had severity rating in EMR, correct diagnosis was not listed in problem list based on NAEPP guidelines, many had not received spirometry, or follow up of their asthma in several months to years. There was no formalized education program in place for patients with asthma. As the practice is a level three medical home it was decided to implement this improvement project in coordination with the asthma collaborative project.

**Characteristics of the Population identified**

Of these 469 patients 25 patients agreed to be part of the specific intervention with the DNP candidate. All other patients received equal interventions by the DNP candidate and some of the interventions were performed by the staff of the facility based on NAECPP guidelines. Following the chart audit all charts were corrected to reflect appropriate classification of asthma severity based on the guidelines. The majority of patients in the group were female (72%), the average age was 51 and 99% of patients were Caucasian. All patients were randomly selected (see Graph 1 in Appendix L).

**Process of the intervention**

A registry was created to show all of the key recommendations of the NAECPP guidelines and the NHLBI guidelines that were needed to be present in the EMR. These elements were also part of the recommendations that would satisfy the chart audit for the asthma collaborative program and the Medical Home Initiative that was started to address asthma as one of its chronic conditions (see Appendix J). The asthma collaborative became part of the intervention as it allowed additional evidence based information to be collected. In order to make sure all of the data was organized and available to staff the asthma registry book was created. In this book certain key elements were organized into excel spread sheets. These elements are: severity of asthma, patient name, gender, date of birth and contact phone number. Also included was, whether a rescue inhaler and or controller inhaler was prescribed, if there are other asthma medications prescribed, if the patient has an asthma action plan or symptom plan, if the patient has received an ACT(asthma control test) score, and when it was given. There was an attempt to get two consecutive act scores. It was noted when the patient had their last visit (and if their asthma was addressed), did the patient receive asthma education by staff, or by asthma educator.

It noted was if the patient required referrals for smoking cessation or other interventions that might be helpful in controlling their asthma, if any urgent care visits had occurred, hospitalizations or ER visits, and lastly if the patient received spirometry within the last year.

The registry book was compiled by the DNP candidate and updated by her and has been shown to staff to help continue this method of tracking. This tracking identified patients that were contacted in a pre-visit call to schedule a planned asthma visit. Twenty five patients were identified and scheduled. The patients were selected randomly from the three doctors list of patients and were based on which patients responded to phone calls and were able to participate. Of these patients 72% were female and 28% were male. There were 64% between the ages of 18 to 56 and, there were 36% between the ages of 57 to 88. There were 99% Caucasians and 1% Pacific Islander (See graph 1 in Appendix L). Each patient was called and an appointment scheduled with the asthma educator (DNP candidate). In reviewing the chart, if the patient required spirometry it was scheduled at this time. Education was given at this visit and an asthma action plan was done and reviewed with the patient input. Medication administration (inhaler use) was reviewed and repeat demonstration was encouraged. If medication changes were indicated the provider was contacted to discuss changes in medication or devices to assist the patient in better control of their asthma. It was explained to the patient that the plan was for them to self- manage and not feel the need or anxiety to contact their provider if there were changes in the their condition. Patients were encouraged to express what would make them feel in control and what would help them to self- manage. Patients were reminded that they were part of the quality improvement project being directed by the DNP candidate and their participation could help them and future patients obtain care that was evidence based and more self-directed.

A key principle of asthma management is encouragement from all providers of care. This principle of self-efficacy is accomplished through patients' self-confidence in the ability to control their asthma. This improves along with the ability to learn the skills that will control it (O'Laughlen, Hollen, & Ting, 2009). Before entering the exam room each patient was given the ACT by clerical staff. All patients commented on having never seen it before, and some had questions regarding the form. The DNP candidate explained what the form meant and how it could help patients understand their asthma and be more in control. While reviewing the answers with patients, they were encouraged to ask questions and explain their answers if they wished. Their refill history, their medication knowledge, and their medication administration technique was also reviewed. The patient's diagnostic category of severity was reviewed, and explained, as needed, to the patient. If it had been over a year, spirometry testing was suggested at the visit or scheduled as soon as convenient for the patient. If spirometry was done the patient was given an explanation of the procedure and what the measures meant. If done previously, then a review of the results was given. The ACT score was documented as an assessment of control and reviewed with the patient. All data was entered into the EMR and written into the asthma action plan, including the patients input and education. Patient's immunizations were checked and patients were encouraged to get those that did not meet the recommendation for patients with asthma (these are the yearly flu shot and the pneumovax). Patients were encouraged to have a follow up to review information, for further education or, for further questions. If there were medication changes a follow-up visit was scheduled.

These patients were reviewed with their primary care provider as soon as possible after the visit or during the visit as needed. The patient's case manager was also informed of visits. A



repeat ACT was done at the next visit to assess response to treatment. The asthma plan was reviewed at this visit, and evaluation of any necessary changes.

### **Self-Management**

To improve self-management patients in the intervention group were given an asthma action plan. Each plan was filled out with the patient and reviewed. Patients were encouraged to talk about their particular triggers, medications, symptoms. They verbalized understanding and repeated how to administer their medications. Through this process it was identified that some patients would benefit from visual instruction, applications were downloaded to an IPAD. For 8% of patients this was beneficial in allowing them to learn their current medications and how to appropriately administer those (The Most Innovative Medical Apps of 2012).

Seventy-six percent of patients seen required medication changes. Using this method of teaching for some patients allowed for self-education, and the applications could be self-directed by the patient with assistance from the DNP candidate. The patient was instructed how they could also download these applications or other applications that help with peak flows and symptom management to use independently.

Through this process the DNP candidate learned that some patients benefit from written instruction. Patients were offered written directions of medication administration. This method of instruction led the DNP candidate to identify a need in the practice. This need was an instructional pamphlet that was useful to the patient and provided the necessary information in an interesting format. Therefore, DNP candidate decided to create a pamphlet that would benefit patients using examples from other sources. The finished pamphlet approved for use in this primary care setting has been shown to patients for their input. Patients have stated that they

found it to be colorful, informative, easy to understand and useful. Those that were shown the pamphlet would like a copy of it.

### **Results**

The outcome of the study was to show increased self-management by asthma patients. Seventy percent of patients identified, were to decrease their use of emergency rooms and acute care visits to access care. All patients with asthma were identified and severity and control status documented by all staff. The plan for this program will continue on as part of the management of these medical home patients.

Every asthma patient in the practice has a clear diagnosis and severity rating of asthma listed in EMR, based on NAEPP guidelines. 90% of patients received an ACT at the moment of first contact. Patients are now specifically scheduled for asthma visits and education. 75% of staff have been instructed on the asthma guidelines and the practice protocol regarding asthma patients. The primary care setting has a clear template of a planned asthma visit. There is a pamphlet to give patients to help them better understand their asthma and the medications they may use. Assessment revealed 76% of the patients were not taking the proper medication for their severity level. Self-management techniques were the foundation of asthma education. The DNP candidate was able to establish an organizational change in the practice.

An examination of the data that was part of the project revealed that there was a significant improvement in the group of 25 patients. The second graph (see chart 1 in Appendix) shows one of the measures that was assessed in 24 of the 25 patients (one patient was eliminated as he/she went into the hospital for an unrelated condition). This chart shows that the DNP candidate analysis of ACT scores using the paired t-test. A statistically significant improvement in asthma control was observed before (Mean=19.04, SD=4.768) after (mean=21, SD=4.443) the

intervention was given. The change in mean ACT scores are likely due to the intervention, not random chance.

### **An Examination of the Data (see Chart 1 in appendix N)**

The other measures which included:

- patients refilling their rescue medication at the proper frequency(refill History)
- verbally confirming how to use their inhaler
- their ability to explain all their meds
- documentation that spirometry was done within the last year
- correct medications are prescribed for control, if patients asthma is considered in control
- documentation of acute care visits
- visit with the asthma educator
- providers were given an updated med list
- patients were provided an updated med list at end of visit
- documentation that correct medications were prescribed
- patient received an asthma plan
- there was a plan for a revisit call or appointment

Chart 1 indicates that in the before group there were only 5-6 patients reflecting standard of care outcomes for evidence base practice. After the intervention the results show that 96% of the patients were doing what was needed based on the guidelines. The proportions (or percent's) jumped from 20% of the group to 100%. Graph 2 in Appendix M represents the statistical test that was performed as a 2-proportion test. In looking at the statistical significance the p-values are at less than 0.05. Cases of controlled asthma following the intervention

increased. Acute visits went from 7 (28%) to 0 (0%) during the three months of the intervention. This is a statistically significant difference. The values for uncontrolled asthma went from 12 (48%) to 8 (32%) which is an improvement, but not one statistically significant change. Percent of patients understanding their rescue medication pre intervention went from 24% to 96% in the post intervention.

## **Discussion**

### **Outcomes and evaluation**

Evidence based asthma education intervention was effective to improve patient's asthma controls. The results of the paired t-test looked at the change for each patient. The evidence showed that each patient improved in their ACT scores post intervention. The improvement in ACT scores signifies more control of their asthma.

In examining the ACT measures the DNP candidate was aware of the sample size, and that it consisted of a small sample and localized to just one clinic. To that end, one can be 90% confident that the true difference (improvement in ACT scores) will be between -2.8120 and -1.1046.

Throughout the intervention there was staff and provider support in varying degrees. Being a part of a project that was showing an effect on improved patient outcomes made it easier to get staff buy in. The hospital and center as a whole was supportive and wanted to see the improvement project be successful. The difficulty arose in the time commitment as the hospital couldn't commit the financial support. Since it was a quality improvement project done as part of the DNP candidate project, the cost was not an issue. The outside preceptor was very supportive and gave insight and resources that were valuable to the success of the project. The support of the staff, providers, the medical home nurse case manager and, practice facilitator was also of

great value. The assistance of the school advisor to the DNP candidate was also of great assistance.

### **Staff Education Resources**

To improve overall outcomes for patients a staff education flip book was created. Included in the book were the following pages: goals and measures for asthma, components of care, asthma management guidelines, what to look for in spirometry (charts of what is normal and what is abnormal), copies of asthma control test, and copy of the asthma action plan, asthma control chart, and asthma severity chart. Pages from the pamphlet that was created for patients were also included: the pages explained what asthma is, what are different triggers, photos of frequently used meds for asthma, and lastly a chart of important points to remind patients when we review meds. The components of the flip book came from evidence based sources. One source was from a resource flip book given to the DNP candidate by the Cheshire Medical Centers Pediatric Asthma Program. Permission was given to copy or use all or some of the items in their flip book which was created from NIH guidelines (Children's Hospital Dartmouth-Hitchcock, 2012).

### **Electronic Medical Records (EMR) Enhancements**

In documenting in the EMR there are key questions that are necessary to ask patients. All staff needed to use documenting techniques and a quick text was created to be used in the EMR (see Appendix H). When patients came in for appointments the staff found it difficult to ask providers for orders regarding spirometry deliverance. With provider approval the DNP candidate created a spirometry protocol that defined which patients needed spirometry and, what would determine the need for post bronchodilator and medication to be used (see Appendix I).

This created specific protocol to follow thereby all clinical staff would do the assessment in the same way.

The EMR has the capability to also create a popup reminder that addresses all of the key parts of the evidence based guidelines that need to be obtained at each visit (ACT, spirometry, asthma plan, and if needed an appointment with asthma educator).

### **Organizational and Outside Support**

As an organization, the hospital was supportive of the project. Having the Chief Nursing Officer of the hospital as the DNP candidates outside preceptor was also beneficial. To continue this project her input was helpful. Meeting with the outside preceptor, the school advisor in the start of the project helped to focus what was going to be accomplished and how this would be put into the practice. Meeting with the outside preceptor at the middle of the project allowed reflection on what was working and what was not working. She gave useful contacts at the hospital to improve the pamphlet that was created and a contact to verify the statistical analysis of what had been accomplished.

### **Collaboration with the Medical Home Model**

The usefulness of the collaboration between medical home and the project was evident in numerous interventions. This was evident by the interaction between the practice and the asthma collaborative initiative. The practice agreed to participate in the asthma collaborative project (which is a project as a collaboration between the Vermont Blueprint for Health and the Vermont Department of Health). This collaborative supports participating practices in implementing the NHLBI and NAEPP guidelines in primary practices. The DNP candidate and one of the providers were part of the team and attended all trainings and phone conferences. This

collaboration also encouraged staff to help in reminder calls to patients or update the DNP candidate when patients needed to reschedule.

Throughout the process, all staff was very supportive and sought out information and suggestions from DNP candidate. Providers also allowed input, but at times needed to be redirected into evidence based protocol. Since the practice is a medical home and this disease is being used as one of the intervention programs of a chronic disease, it encouraged compliance. The results of the overall practice intervention and collaborative data of 50 random patients was included at baseline in February and at completion of collaboration in March (see Appendix O Graphs 3-7).

### **Pre and Post Test of Medical Home Staff**

At the start of the project staff was trained and instructed on the key elements that would be collected on all patients with asthma. Staff was instructed that everyone was an important part of the education of each patient. In Appendix A the plan of flow for each patient with asthma that comes into the practice is outlined. Starting from this training forward all patients with asthma would have certain key elements documented in the chart, verifying that they had received care that was evidence based following NAECPP and NIH guidelines. Staff were taught about the registry book and what it contained. They were informed that patients had been contacted to come in for visits. Some patients were chosen for the quality improvement project were seen by the asthma educator (DNP candidate). All other patients with asthma would be given spirometry, an ACT and, asthma plan. All patient's medication lists were updated and certain criteria was obtained and documented in the patient visit. To assist with this a quick text was developed so everyone would remember to ask patients important questions that were evidence based and followed NAECPP and NHLBI guidelines. These guidelines were explained

and staff was informed that we were also part of an asthma collaborative that would help to improve the asthma care our patients were receiving.

At the onset, a pretest was administered to evaluate staff knowledge and need for training. The providers were met with to also review what elements were needed that was evidence based. The results of the survey given at this time showed all medical staff did not know that spirometry needed to be performed yearly at the minimum. They understood what asthma control was but not why the patient needed to be more in control of their asthma. The Asthma Control Test (ACT) was new and needed to be explained. The importance of this test and the frequency was explained. Asthma severity ratings were familiar to providers but there was not a clear definition of what they were in patient records, this was changed so all charts reflected only 4 categories based on NIH guidelines. How each patient was classified for severity was reviewed with providers, and changed in chart by DNP candidate. Each staff member needed information to understand the frequency of visits and ACT administration. Most knew the names of the rescue and controller medications but not specifically how they worked or how they should be used. Some did not know that all patient needed an asthma action plan and it should be documented in patient record. All staff was not aware of Immunizations recommendations for asthma patients. The pretest led to intermittent 1:1 teaching for some staff to reinforce certain elements of good asthma care, as well as instructing staff to encourage the patients to self-manage.

In the post survey 100% of the staff members understood how to do spirometry, when, and what it meant. 98% knew spirometry protocol. They all understood what our goal in asthma care was. All of them understood the reason why we did the ACT, what results showed a need for further intervention and, how often to give it. They all knew that there were 4 asthma severity



classifications. They understood the terms controller and rescue medication and were able to explain it. There was still some work needed on the asthma action plan as many patients were not receiving one. The plan was being left up to the provider. What was determined as being helpful would be if the staff filled in some of the information with the patients before they saw the provider or at the time of the spirometry testing. Some staff did not know that there should be no limitations to patients with asthma if they are in control. Side effects and long term affects were questions some of the staff had regarding long term use of controller medications. The staff also wanted to know how we were doing since the project started. They were informed of baseline data that was collected in January with chart reviews done in February. At the start of the review they were informed we did very poorly on the elements showing that our patients were receiving evidence based care. Through the asthma collaborative intervention and the quality improvement project and their hard work, 53% of the patients seen in the practice received all of the elements that proved evidenced based care. They were informed we had come a long way but still had a way to go.

### **Impact of Project**

The impact of the project has been noticeable. All staff use the proper terms of good evidence based care. Staff seeing the diagnosis of asthma know what key components are needed. Patients with asthma are not falling through the cracks. Patients that are seen understand what self-management is and are encouraged to set goals and be more in control. As quoted previously “Organizations need to have a system where education is integrated into everything that goes on in the clinical setting. The minute a patient walks into the clinic the education must start and the message must continue to be reinforced through the treatment” (Utah Department Of Health, 2009 p. 1). This is no longer just a statement but a reality in this primary care

practice. All medication was already reviewed at each patient encounter, but now asthma meds will trigger a response from staff. More patients are called to come in for asthma visits that include spirometry and a review of their plan. There is a sense of accomplishment by all staff due to changes we have initiated in the asthma patient population. Tools have been created for use to help to simplify documentation (Quick texts), assist with educating asthma patients (flip Book) and, a created tracking (registry) for asthma patients. The final presentation to the asthma collaborative showed a significant improvement in asthma patient's care.

### **Limitations**

One limitation experienced by the DNP candidate in this project was, limited time to do the project. Overall, the time that was needed was more than could be done in an 8 hr. day. There was a short three months of time for the project. Patients who came in regularly were easier to catch but did not always want to be part of the quality improvement project. Another limitation was a varied age range of patients, but there was not diversity of ethnicities. This could also be due to the location and the rural area of the practice.

### **Post Project Implementation**

The project will continue since certain key elements show improvement in patient self-management and the practice/hospital are committed to sustaining this project. The quick text and the pop ups (see Appendix K) that appear when a patient comes into the practice will help make sure all of the measures are obtained. The practice is also part of the National Committee for Quality Assurance (NCQA) certified medical home. This creates a responsibility, and encouragement to maintain the top level of care. Since the practice is getting ready for Medical Home reevaluation in September everyone is vested in wanting it to continue.

## Conclusions

The conclusions are that this pilot project was successful for the small group that was specifically addressed by the DNP candidate. For a complete analysis of the intervention on the effect on controlling asthma, there may need to be a larger sample of patients or a longer period of intervention. For the overall practice, the project was successful in showing that evidence based care does have an effect on patient satisfaction and self-esteem. Patients remarked that they understood their asthma more and felt in control and showed evidence of control. The project was successful due to the hard work of all staff including medical, clinical, providers, medical home team (including case manager). Of equal importance was the guidance of the asthma collaborative and the practice team, the medical home facilitator, the outside preceptor and, the doctoral advisor. All participants were necessary in order to make this quality improvement project successful.

Using the standards of treatment for asthma developed by the expert panel reports from the National Heart, Lung, and Blood Institute allows a clear roadmap to patient centered control (National Heart Lung And Blood Institute, 2007). A patient-centered practice identifies patients, and knows that the patient is the driver of their care, and need to be more involved in decisions about their care, and in the management of their health (Safety Net Medical Home Initiative, 2010). Patients need to actively engage in their healthcare, and good providers of care will use Evidence Based Asthma Education Interventions that use Self- Management Guidelines to provide this care.

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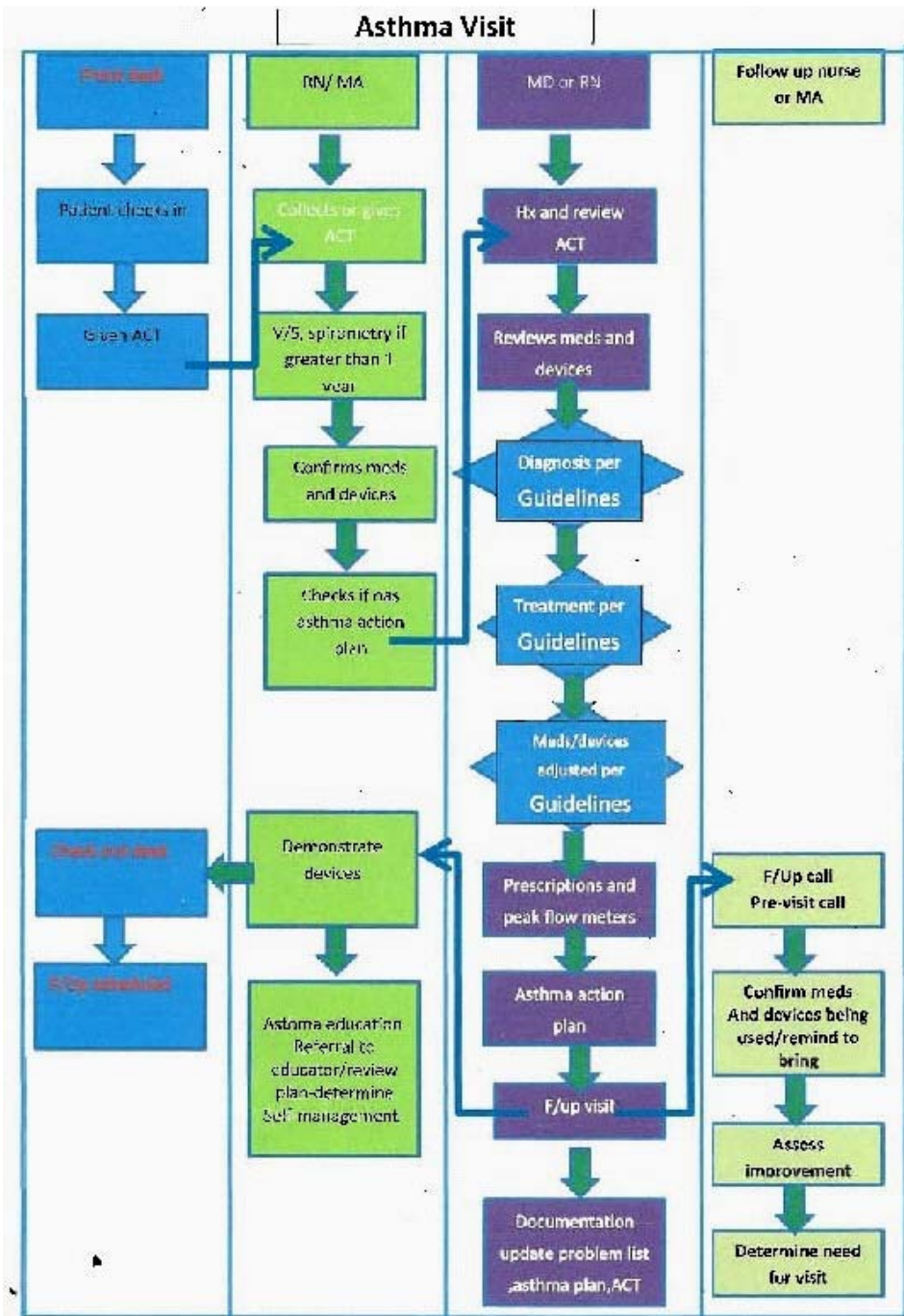
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Appendix A



## **Appendix B**

### **Consent Form for Participation in a Quality Improvement Project**

#### **University of Massachusetts Amherst**

**Researcher(s):** Jeanette Toro-Linnehan, DNP Candidate, Professor Raeann G LeBlanc, Chair, Professor Jeungok Choi, Co-chair

#### **Study Title: Evidence Based Asthma Education Intervention for Adults in a Primary Care**

#### **Setting Using Self- Management Guidelines**

##### **1. WHAT IS THIS FORM?**

This is called a Consent Form. It will give information about the improvement project so you can make an informed decision about participating in this project.

##### **2. WHO IS ELIGIBLE TO PARTICIPATE?**

Male and Female adults 18 to 90 who are patients through Southwestern Vermont Health Center, Deerfield Valley Campus/Medical Home and have been seen in the last two years with a diagnosis of asthma.

##### **3. WHAT IS THE PURPOSE OF THIS STUDY**

##### **(Quality Improvement Project)?**

The purpose of this quality improvement project is to conduct assessment of patients with asthma incorporating the NAEPP guidelines within the medical home model, collect confidential information and data on proper asthma diagnosis, documentation on level of control, data on medication use and proper administration. It will address asthma education that will

provide self-management and report problems and interventions needed to your provider and the medical home team.

**4. WHERE WILL THE STUDY TAKE PLACE AND HOW LONG WILL IT LAST?**

This project will take place between January, 2013-April, 2013 and will take place in the Deerfield Valley Campus Medical home. There will be an initial visit taking a maximum of sixty minutes and a minimum of one follow up visit taking approximately 30 minutes.

**5. WHAT WILL I BE ASKED TO DO?**

If you agree to take part in this project, you will be asked to share information about your asthma and your management of it. You will be asked how you currently manage your asthma, what medications you take and what you understand about your disease. You will be asked to provide information which will be kept confidential. Your permission will be requested. If you agree this information will be shared with your medical provider and medical home team and Blueprint team. You may skip any questions you feel uncomfortable answering.

**6. WHAT ARE MY BENEFITS OF BEING IN THIS STUDY?**

The benefit of being part of this project is that you may develop a better understanding of your asthma and how to self-manage it. You may develop a better relationship with the medical home team. You may see an improvement in your health. In addition, through participating in this project, you may identify further support services through the medical home and become an active participant in teaching them your needs.

**7. WHAT ARE THE RISKS OF BEING IN THIS STUDY?**

We believe there are no known risks associated with this project; however, a possible inconvenience may be the time it takes to complete your participation. Interviews and

assessments of your disease, medications and your health do take time and that may pose an inconvenience of up to one and one half hours.

#### **8. HOW WILL MY PERSONAL INFORMATION BE PROTECTED?**

The following procedures will be used to protect the confidentiality of your study records. Data will be input into a computer software system. This data will be associated with a study number and not with any personal information. Any healthcare information shared with your provider will only be shared with your permission and following the HIPAA Privacy Rules. All healthcare providers are required to follow these in the exchange of any patient related health information. The researcher will keep all study records, including any codes to your data, in a secure location at the facility. Research records will be labeled with a code. A master key that links names and codes will be maintained in a separate and secure location. The master key will be destroyed after the close of the study in 2015. All electronic files, including the database records and spreadsheets containing identifiable information, will be password protected. Any computer hosting such files will have password protection to prevent access by unauthorized users. At the conclusion of the study, the researchers may publish their findings. Information will be presented in summary format. You will not be identified in any publications or presentations.

#### **9. WHAT IF I HAVE QUESTIONS?**

Take as long as you like before you make a decision, I will be happy to answer any question you have about the study. If you have further question about this project, or if you have a research related question, you may reach Jeanette Toro-Linnehan at 802-464-5311

#### **10. CAN I STOP BEING A PART OF THIS PROJECT?**

You do not have to be in this improvement project if you do not want to. If you agree to be in this project, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

**11. WHAT IF I AM INJURED?**

SVMC/DVHC does not have a program for compensating subjects for injury or complications related to quality improvement projects, but the study personnel will assist you in getting treatment.

**12. SUBJECT STATEMENT OF VOLUNTARY CONSENT**

When signing this form, I am agreeing to voluntarily enter this project. I have had a chance to read this consent form, and it was explained to me in a language that I use and understand. I have had the opportunity to ask question and have received satisfactory answers. I understand that I can withdraw at any time. A copy of this signed Consent Form had been given to me.

<p style="font-size: 2em; margin: 0;">X</p> <hr style="border: 0.5px solid black;"/> <p style="font-size: 0.8em; margin: 0;">Participant Signature</p>	<p style="font-size: 2em; margin: 0;">X</p> <hr style="border: 0.5px solid black;"/> <p style="font-size: 0.8em; margin: 0;">Participant Name(Print)</p>
--	--

**Date:**

By signing below, I indicate that the participant has read and, to the best of my knowledge, understand the details contained in this document and had been given a copy.

<p style="font-size: 2em; margin: 0;">X</p> <hr style="border: 0.5px solid black;"/> <p style="font-size: 0.8em; margin: 0;">Name of Person Obtainig Consent(print)</p>	<p style="font-size: 2em; margin: 0;">X</p> <hr style="border: 0.5px solid black;"/> <p style="font-size: 0.8em; margin: 0;">Signature of Person Obtaining Consent</p>
---	--

**Date:**

**Appendix C****Project Protocol****STEP 1**

- \_\_\_\_\_ Review charts for all patients that may be included in study and create registry
- \_\_\_\_\_ Telephone call to patients-to explain project and agreement
- \_\_\_\_\_ Schedule Pre-visit protocol (review history of last visit)
- \_\_\_\_\_ Schedule visit

**STEP 2**

- \_\_\_\_\_ Planned asthma visit with Asthma Educator (DNP candidate)
- \_\_\_\_\_ Obtain informed consent and agreement to share information with team  
(Medical Home and Blueprint)
- \_\_\_\_\_ If yes to all above continue to next steps

**STEP 3**

- \_\_\_\_\_ Administer ACT (asthma control test)
- \_\_\_\_\_ Review current medication (adherence, refill history, techniques with  
medications)
- \_\_\_\_\_ Review proper diagnostic category: Intermittent, Mild persistent, Moderate  
Persistent, and Severe Persistent
- \_\_\_\_\_ Documentation of level of control
- \_\_\_\_\_ Asthma action plan
- \_\_\_\_\_ Have spirometry done if more than 1 year

\_\_\_\_\_ Have a self-management plan that is a partnership with the patient as part of the medical record

\_\_\_\_\_ Confirm receipt of flu shot, and pneumovax

\_\_\_\_\_ If time permits. referral to smoking cessation counselor or review with patient

\_\_\_\_\_ Confirm follow-up apt

**Step 4**

\_\_\_\_\_ Prior to next visit discussion with primary care provider, case manager and medical home team for concerns or education needed.

\_\_\_\_\_ Meet with Case Manager assess her concerns, and history of ER and hospitalizations

**Step 5 Follow-up visit**

\_\_\_\_\_ Repeat ACT

\_\_\_\_\_ Review asthma action plan

\_\_\_\_\_ Review need for changes

\_\_\_\_\_ Identify need for further education

\_\_\_\_\_ Speak with case manager and identify any transfers to hospital or ER

\_\_\_\_\_ Update medication list if needed

\_\_\_\_\_ Update asthma registry

\_\_\_\_\_ Thank patient for their participation

\_\_\_\_\_ Provide referrals as needed

Name: \_\_\_\_\_

Signature \_\_\_\_\_ Date of Completion: \_\_\_\_\_

**Appendix D**

**Goals, Objectives, and Outcome Indicators**

Goal 1: Decrease use of rescue measures to maintain control of asthma through a planned educational visit and an increase in patients self-reported scoring measures

Objectives	Outcome Measures
Patients will meet with asthma educator. Or trained asthma staff to review their current asthma plan and understanding of how to control their asthma	90% of enrolled participants will have a current asthma plan in their medical record and also have a copy to take home by March 2013
Patients will have at least 2 ACT's documented in their chart within successive visits	70% of those enrolled will have compiled this assessment and show a decrease in their scores showing and improvement in their asthma control by April 2013.
Patients will have a current asthma medication list that is appropriate to their control and diagnosis category	90% of patients will show a decrease in rescue medications and proper step protocol based on NAEPP guidelines by March 2013



<p>Patients will have a decrease acute care visit, ER visits or hospitalizations</p>	<p>70% of patients will have documented decrease in all forms of uncontrolled asthma visits by April 2013</p>
<p>Patients will be able to express proper use of inhalers and identify rescue and control medications</p>	<p>90 % of patients will be able to verbally repeat directions on different inhalers by April 2013</p>

Goal 2: Decrease misuse of inhalers and other medications prescribed to patient through knowledge of medications.

Objectives	Outcome Measures
<p>Enrolled patients will complete an educational program with return demonstration of proper administration of medication techniques</p>	<p>80% of patients will be able to show proper inhaler technique and be able to explain the need for a spacer for proper delivery. By March 2013</p>
<p>Enrolled patients will be able to identify their medications, the purpose of each inhaler and how they function. The difference between a rescue medication and a controller medication</p>	<p>80% of patients will be able to verbally explain their medications and have an understanding of their proper use by March 2013</p>

<p>There will be a decrease in rescue medication and proper use of controller medication as evidenced by proper refill requests</p>	<p>80% of patients will have not requested their rescue medication on a monthly basis unless in an exacerbation by March 2013</p>
<p>Primary care providers will receive a recommended medication list based on the patients level of diagnosis and control</p>	<p>By March 2013 90% of patients will be appropriately identified by diagnosis level and control in their medical record.</p>
<p>Patients will receive an updated Asthma action plan that identifies either symptoms or peak flow measures to assess their current control</p>	<p>By March 2013 70% of patients will have received their plan, reviewed it with their provider and show a level of understanding</p>
<p>Patients will have a current medication list and inhaler list that they can take with them to all medical appointments, including acute care visits and specialty visits</p>	<p>By March 2013 90% of patients will be able to provide their medication list when requested at any medical appointments.</p>

Goal 3: Decrease risk of adverse events that could cause a decrease in lung function or place the patient at risk for developing long term consequences

Objectives	Outcome Measures
<p>Enrolled patients will understand how long term lack of control of symptoms can lead to adverse effects in lung function and health. Patients will understand how asthma affects the lungs.</p>	<p>70% of patients will understand how asthma affects the lungs and how control of asthma will decrease the negative affect on their lungs by April 2013</p>
<p>Have at the minimum yearly spirometry to assess lung health and have patients understand measures</p>	<p>90% of patients will have at a minimum a yearly spirometry test done and show 70% improvement in knowledge regarding the results by April 2013</p>
<p>Patients will show proper use of their asthma action plan</p>	<p>70% of patients will show they understand their plan and have used it by April 2013</p>

Goal 4: Increase in practice management of asthma care that is based on the National Asthma Education and Prevention Program (NAEPP) guidelines.

Objectives	Outcome Measure
Patients identified in the asthma registry will have appropriate care needs identified based on guidelines	90% of patients will be offered proper care based on guidelines from staff by May 2013
Increased documentation of asthma care plans, ACT scores, planned asthma visits(minimum every 6 months), spirometry, immunization	90% of patients will have required documentation in Electronic Medical Record ( EMR) by May 2013
Increase in knowledge by staff on how to instruct, teach, monitor and provide guideline based care to asthma patients	Staff will receive a pre and post test based on asthma guidelines

## Appendix E

### Letter of Institutional Support



100 Hospital Drive  
Bennington, VT 05201  
phone 802.442.6361  
fax 802.442.8331

svhealthcare.org

January 8, 2013

Doctor of Nursing Practice Graduate Committee  
University of Massachusetts  
Skinner Hall  
651 North Pleasant Street  
Amherst, MA 01003

To Whom It May Concern:

Southwestern Vermont Medical Center supports the work of your student and DNP candidate in the Public Health Nurse Leadership Program, Jeanette Toro-Linnehan RN MSN/MPH AE-C. Ms. Toro-Linnehan anticipates completion of her degree in 2013 (Doctor of Nursing Practice, Public Health Nurse Leader).

I have been fortunate to work with Ms. Toro-Linnehan in the past and look forward to working with her during the coming spring semester. Our organization will provide support as needed for the program which she is conducting entitled *A Review of Asthma Education for Self-Management to Improve Patient Outcomes*.

Asthma has been identified as the most common chronic condition in the US. The issue of asthma management and self efficacy is critical to improving the health of our communities and reducing the cost of health care. We support the study of evidence-based asthma education for adult patients in primary care and the role of the nurse in teaching self management.

Please do not hesitate to contact me if you have questions or need additional information.

Thank you,

Carol A. Conroy DNPc,  
Chief Nursing Officer and Vice President for Operations  
Southwestern Vermont Health Center

**Appendix F**

**Time Line**

TIME	ACTIVITY	PERSON RESPONSIBLE
Pre-Program  December 2012	In-service to staff at DVHC and contact local vendors. Complete compiling of charts and corrections to identify proper patients	DNP candidate  Doctoral  Committee  Members
January 2013	Complete pre-visit assessments and generate data. Review with primary care providers and staff at DVHC. Update to asthma collaborative due	DNP candidate
February –March  2013	Complete contact with primary care doctors and case manager to address patient needs and deficits.	DNP candidate

	Follow up with patients as needed. Address specific issues with plan and flow chart of care	
February 2013 March 2013	Follow-up visit and assessments. Evaluate response to education, if referrals suggested assess compliance	DNP candidate
March 2013	Data collection completed. Data evaluation and analysis. Complete written evaluation report	DNP candidate
April 2013	Sharing of findings to DVHC/SVMC and collaborative. Determine sustainability of project	DNP candidate
April 2013-May 2013	Final Paper for publication	DNP candidate

**Appendix G**

**Budget**

<b>Item</b>	<b>Cost</b>
<b>Computer Information systems</b>	
Laptop(already purchased)	\$1500
Minitab software	\$100 use was donated by SVMC
<b>Personnel</b>	Are part of DVHC
Asthma Educator	\$30/hour x8 hrs.(24) x 3 months
(DNP candidate) volunteer time	\$2880
<b>Transportation</b>	0
<b>To collaborative meetings</b> x 2= .55 mile x 40 miles	\$44
Total estimated cost  This will be volunteer time or assisted by blueprint	\$4524 but is \$0 dollars as this is part of improvement pre and post study



Appendix H

Quick text screen shot

Centricity EMR - Jeanette Toro-Linnehan, RN,MSN/MPH @ Deerfield Valley Health Center (cpoemr) - 4/7/2013 7:08 PM - [Chart]

Go Actions Options Help  
 Desktop Chart Appts Reg Reports New View Print Help EXIT

**BLACK TEST** Patient ID: M0188758 Home: (000)000-0000 Work: 464-3333  
 2 Years & 5 Months Old Female (DOB: 10/12/2010) PCP: Kori DeLuca, RT(R), RN, BSN Insurance: SLIDING (-100) Policy#: Group:

Find Pt. Protocols Graph Handouts Probs Meds Refills Allergies Directives Flowsheet Orders End Update

Summary History Problems Medications Alerts/Flags Flowsheet Orders Documents Update

Doc ID: 1002 Properties: Office Visit at DVHC on 04/07/2013 7:06 PM by Jeanette Toro-Linnehan, RN,MSN/MPH Alerts(6)/Flags(0)  
 Summary: asthma education Drug interactions Attach Properties...

Inserted

- Vital Signs-2-CCC
- HPI-CCC-2
- VITL
- Self Management G
- PMH-PSH-CCC
- FH-SH-CCC
- Risk Factors-GECC
- ROS-CCC
- PE-CCC
- Problems-CCC
- CPOE A&P-CCC
- Patient Instructions-
- Prescriptions

Attachments

Favorites

- Blank image
- Allergy Injection
- Asthma Q&E-A-F
- Fall Flu
- Immunization Ma
- Laceration/Your

Nurse Comments: Q1 \_\_\_\_ 1-5  
 Q2 \_\_\_\_ 1-5  
 Q3 \_\_\_\_ 1-5  
 Q4 \_\_\_\_ 1-5  
 Q5 \_\_\_\_ 1-5

Total ACT score \_\_\_\_ 19 or less, asthma is not controlled.

SEVERITY

# of night time awakenings in past month: \_\_\_\_ <2x a month, \_\_\_\_ >2days/week, \_\_\_\_ daily  
 # of rescue inhaler uses in past month: : \_\_\_\_ <2x a month, \_\_\_\_ >2days/week, \_\_\_\_ daily  
 # of interferences with activities: \_\_\_\_ none, \_\_\_\_ minor, \_\_\_\_ some, \_\_\_\_ extreme  
 # of acute attacks requiring Prednisone in past year: \_\_\_\_  
 Frequency of symptoms \_\_\_\_ days per week, \_\_\_\_ daily, \_\_\_\_ all day  
 # of ER visits in past year: \_\_\_\_  
 # of hospitalizations in past year: \_\_\_\_

Controller medication- frequency:  
 Refill history:  
 Last asthma education  
 Other asthma meds  
 Do you use a peak flow meter?  
 Reviewed inhaler technique:  
 Immunizations: flu \_\_\_\_ pneumovax \_\_\_\_

## Appendix I

### Spirometry Protocol

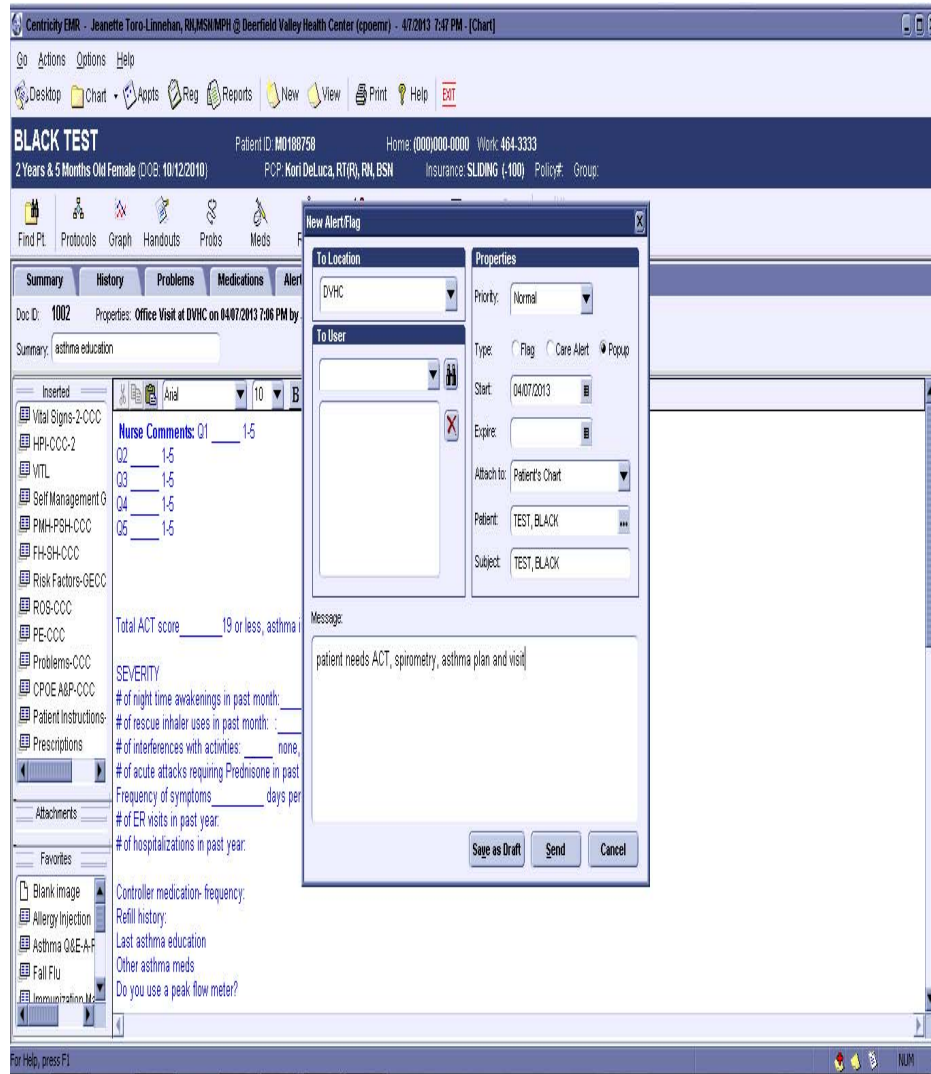
- All patients who have never had spirometry with a diagnosis of asthma will have a pre and post test done.
- If patients have asthma they need spirometry done yearly
- If patients have spirometry and it is normal no further spirometry is required for 1 year.
- If the spirometry results are not normal or inconclusive after administering an albuterol nebulizer treatment a post bronchodilator spirometry will be done. This test should be done **no less than 15 minutes and no more than 30 minutes after administering the albuterol.**
- The time schedule for performing the complete evaluation is approximately 45 minutes.

**Appendix J****Asthma Registry**

1. PROVIDER	2. ID NUMBER
3. PATIENT NAME	4. PHONE NUMBER
5. GENDER	6. BIRTH DATE
7. PREVISIT CALL	8. SEVERITY RATING
9. RESCUE INHALER	10. CONTROLLER MEDICATION
11. OTHER ASTHMA MEDS	12. ASTHMA CARE PLAN
13. SYMPTOM CARE PLAN	14. PEAK FLOW METER
15. SPACER	16. SPIROMETRY
17. ACT/DATE	18. ACT -1 SCORE
19. ACT 2/DATE	20. ACT -2 SCORE
21. ER VISITS	22. HOSPITAL DAYS
23. URGENT CARE DAYS	24. LAST VISIT
25. IMMUNIZATIONS CURRENT	26. ASTHMA EDUCATION-STAFF
27. ASTHMA EDUCATION EDUCATOR	28. REFERRALS SMOKING OR SW OR ALLERGIST OR GU

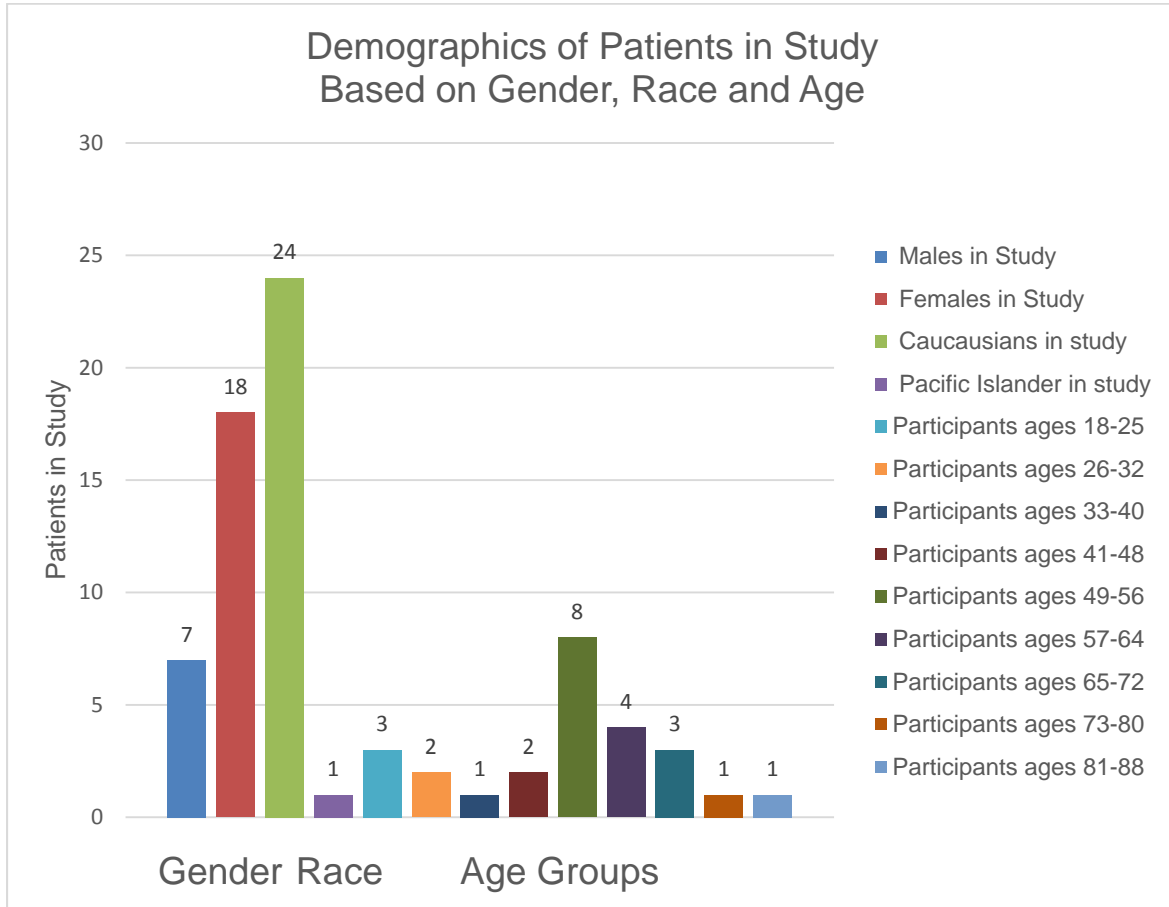
## APPENDIX K

### FLAGS & QUICK TEXT



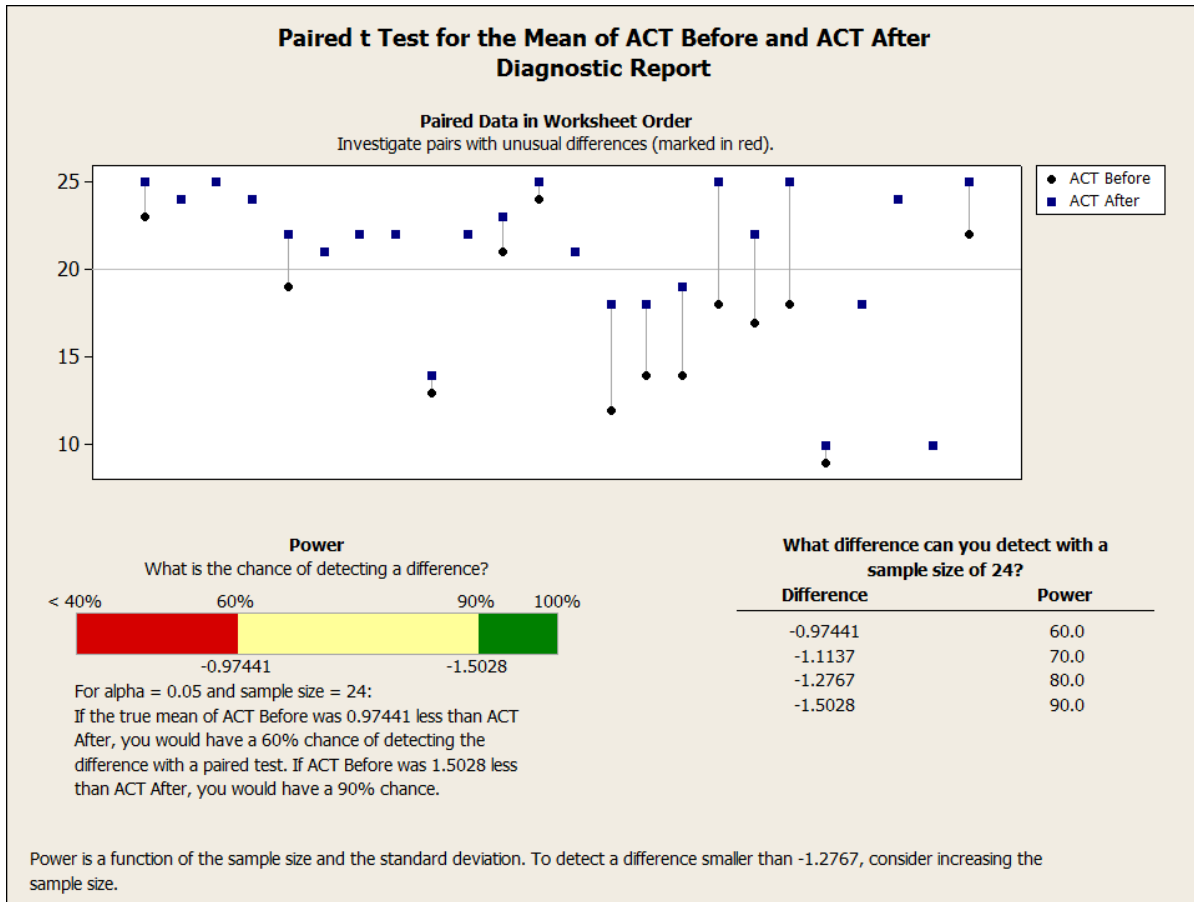
**Appendix L**

**Graph 1**



Appendix M

GRAPH 2



Appendix N

CHART 1

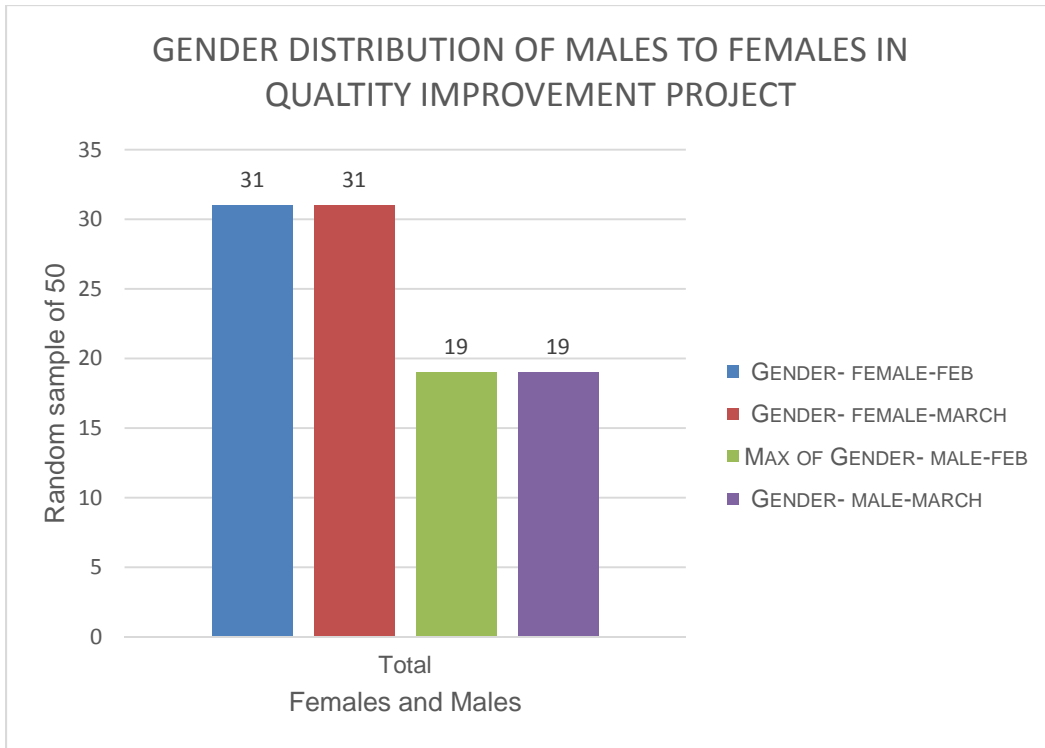
	sample n	Mean Before	SD Before	Mean After	SD After	p-value	test
Asthma Control Score	24	19.04	4.768	21	4.443	0.001	paired t-test
	sample n	Count Before	Percent Before	Count After	Percent After	p-value	test
Rescue Meds(refill History count)	25	6	0.24	24	0.96	0.000	test of two proportions (percent defective)
Verbally Confirm Inhaler	25	4	0.16	24	0.96	0.000	test of two proportions (percent defective)
Correct Inhaler Technique	25	6	0.24	24	0.96	0.000	test of two proportions (percent defective)
Patient can Explain Meds	25	5	0.20	25	1.00	0.000	test of two proportions (percent defective)
Spirometry	25	5	0.20	25	1.00	0.000	test of two proportions (percent defective)
Correct medications prescribed for control	25	6	0.24	25	1.00	0.000	test of two proportions (percent defective)
Uncontrolled Asthma	25	12	0.48	8	0.32	0.193	test of two proportions (percent defective)
acute care visits	25	7	0.28	0	0.00	0.005	test of two proportions (percent defective)
met with asthma educator	25	25		25			
updated med list given to provider	25	25		25			
patients provided with med list	25	25		25			

Chart 1 Notes: Test and CI for Two Proportions

Sample X N Sample p  
 1 6 25 0.240000  
 2 24 25 0.960000  
 Difference = p (1) - p (2) Estimate for difference: -0.72 95% CI for difference: (-0.904195, -0.535805) Test for difference = 0 (vs not= 0): Z = -7.66 **P-Value = 0.000**

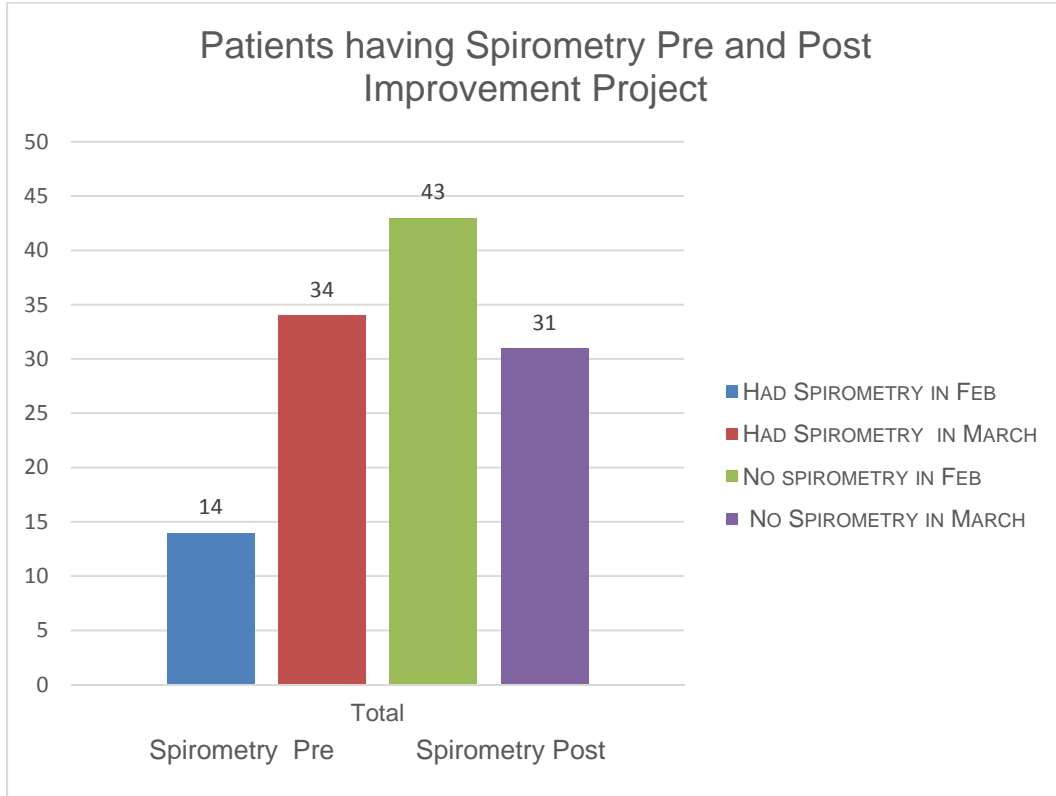
**Appendix O**

**GRAPH 3**

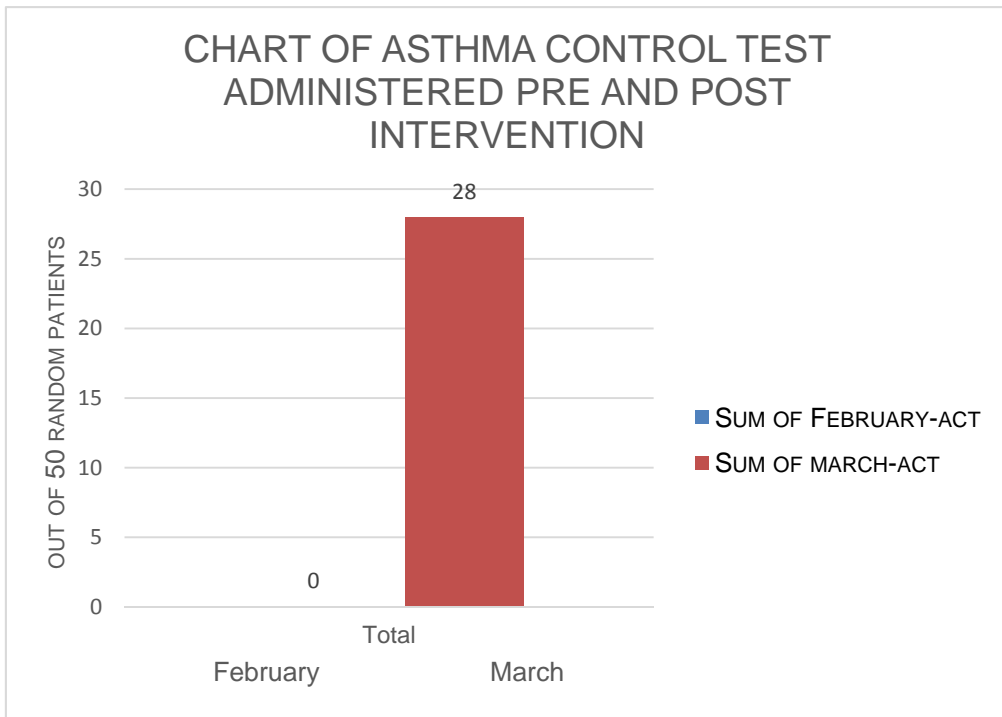




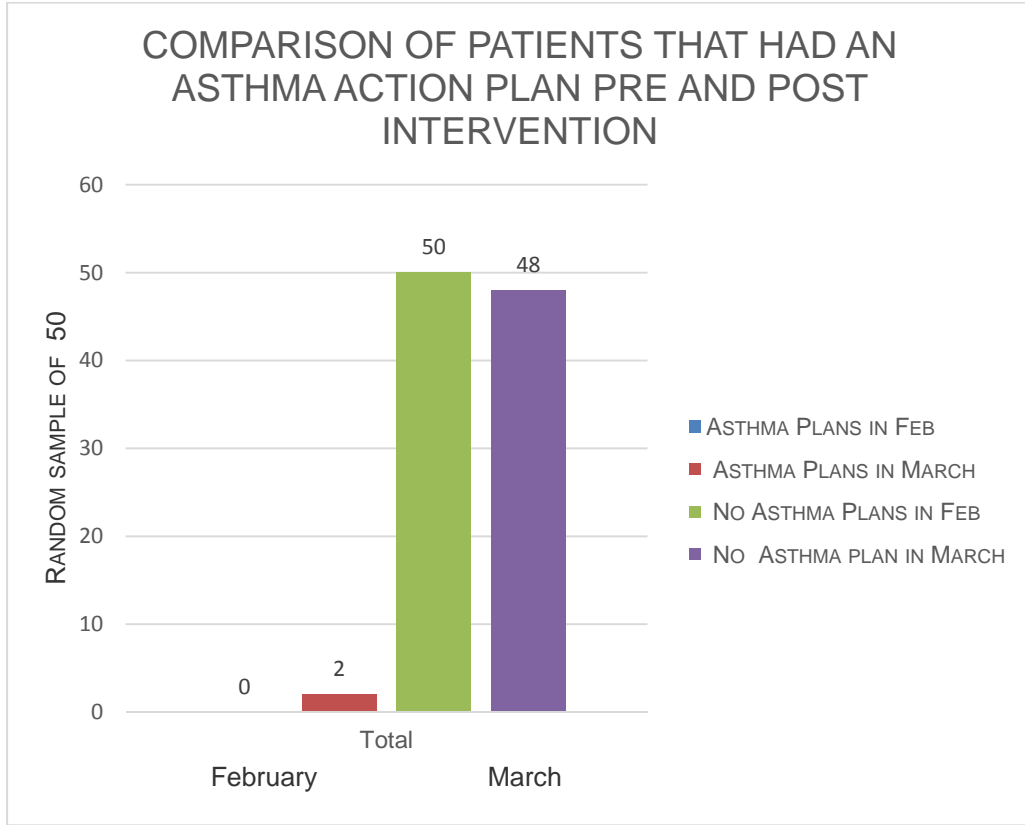
**GRAPH 4**



**GRAPH 5**



**GRAPH 6**



**GRAPH 7**

